

A study of amorphous aerosol and ice particles in the Earth's atmosphere with polarization measurements

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Unlike crystals, amorphous solid particles do not have the long-range order (e.g., hydrogen-bond in ice). Organic substances tend to transition into amorphous phase (viscous secondary organic aerosols) upon drying of aqueous droplets [1]. There were studies suggesting that amorphous water/ice particles exist in the atmosphere as well (e.g., [2,3]). One of the key feature of these amorphous aerosol and cloud particles is the so-called “negative polarization” (polarization perpendicular to scattering plane) in near-backscatter angles. Here we will briefly introduce the optical properties of these particles and preliminary observational studies using existing POLDER measurements. We will also briefly introduce a NASA/KASI CubeSat polarimeter concept that can provide most favorable viewing geometry for making these measurements.

References

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